

### ABSTRACT OF THE DISCLOSURE

A process involves collecting data relating to a particular condition and parsing the data from an original set of variables into subsets. For each subset defined, Mahalanobis distances are computed for known normal and abnormal values and the square root of these Mahalanobis distances is computed. A multiple Mahalanobis distance is calculated based upon the square root of Mahalanobis distances. Signal to noise ratios are obtained for each run of an orthogonal array in order to identify important subsets. This process has applications in identifying important variables or combinations thereof from a large number of potential contributors to a condition. The multidimensional system is robust and performs predictive data analysis well even when there are incidences of multi-collinearity and variables with zero standard deviations in reference group or unit space. Separate methods are provided: adjoint matrix Gram-Schmidt's method for multi-collinearity problems, and modified Gram-Schmidt method for the cases where there are variables with zero standard deviation to achieve data analysis.